

Sorghum

REFERENCE MATERIAL

Pedigree

Institution: Oklahoma State University
Location: Garvin County, OK
Genotype: Forage Variety ES5200

Harvested: 2012
Received at INL: 2013
Sample Preparation: Ground to pass through a 1-inch sieve using a Vermeer BG480 grinder and a Bliss Hammermill with no screen

Composition

Table 1. Chemical composition^a of Reference Sorghum

%Structural Ash	%Extractable Inorganics	%Structural Protein	%Extractable Protein	%Water Extracted Glucan ^b
4.07	2.57	2.18	1.39	0.58
%Water Extracted Xylan ^b	%Water Extractives Others	%EtOH Extractives	%Lignin	%Glucan
0.34	6.99	2.42	16.01	34.82
%Xylan	%Galactan	%Arabinan	%Acetate	%Total
20.44	1.14	2.82	0.84	96.61

^aDetermined using NREL "Summative Mass Closure" LAP (NREL/TP-510-48087)

^bDetermined by HPLC following an acid hydrolysis of the water extractives

Proximate, Ultimate & Calorimetry

Table 2. Proximate, ultimate, and calorific values for Reference Sorghum (reported on a dry basis)

Proximate ^a			Ultimate ^b			Calorimetry ^c	
%Volatile	%Ash	%Fixed Carbon	%Hydrogen	%Carbon	%Nitrogen	HHV	LHV
77.81	7.77	14.42	5.63	45.62	0.68	7880	6554

^aProximate analysis was done according to ASTM D 5142-09

^bUltimate analysis was conducted using a modified ASTM D5373-10 method (Flour and Plant Tissue Method) that uses a slightly different burn profile

^cHeating values (HHV, LHV) were determined with a calorimeter using ASTM D5865-10

Elemental Ash

Table 3. Elemental ash composition^a of Reference Sorghum

%Al as Al ₂ O ₃	%Ca as CaO	%Fe as Fe ₂ O ₃	%K as K ₂ O	%Mg as MgO	%Mn as MnO	%Na as Na ₂ O	%P as P ₂ O ₅	%Si as SiO ₂	%Ti as TiO ₂	%S as SO ₃
2.65	4.37	1.07	18.58	7.37	0.08	0.41	2.52	50.70	0.19	1.98

^aDetermined as described in ASTM standards D3174, D3682 and D6349

Particle Characteristics

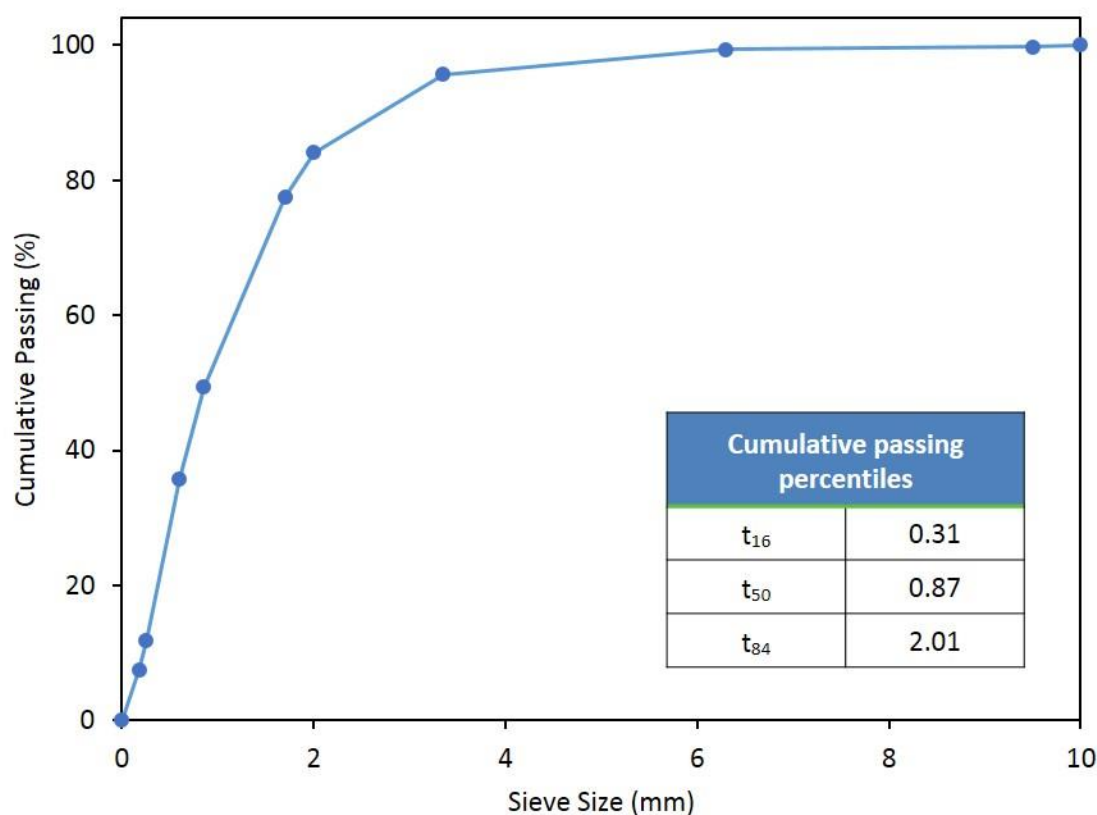


Figure 1. Cumulative passing percent of 1-inch Reference Sorghum determined according to ANSI/ASAE S319.4 using a Ro-Tap test sieve shaker (Model RX-29, W.S. Tyler) and a 15 minute total sieving time. The cumulative passing percentile sieve sizes (e.g., t_{16}) were calculated by interpolation and represent theoretical sieve sizes that would retain 16, 50 or 84% of the particles by mass.

Contact

For questions regarding biomass material or analytical data please contact Amber Hoover at amber.hoover@inl.gov or 208-526-5992.

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